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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/840,088	05/06/2004	Damien Bonaventure	CA920030011US1	7850
25259	7590	05/21/2007		
IBM CORPORATION 3039 CORNWALLIS RD. DEPT. T81 / B503, PO BOX 12195 RESEARCH TRIANGLE PARK, NC 27709			EXAMINER TECKLU, ISAAC TUKU	
			ART UNIT 2192	PAPER NUMBER
			NOTIFICATION DATE 05/21/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

RSWIPLAW@us.ibm.com

Office Action Summary	Application No. 10/840,088	Applicant(s) BONAVENTURE ET AL.	
	Examiner Isaac T. Tecklu	Art Unit 2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION:

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>05/06/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to the application filed on 05/06/2004.
2. Claims 1-17 have been examined.

Oath/Declaration

3. The office acknowledges receipt of a properly signed oath/declaration filed on 09/20/2004.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-8 and 11-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for lacking the step of determining an execution order for machine instructions to reduce spill code. The claim does not provide the step(s) of determining an execution order for machine instructions to reduce spill code.

Claims 2-8 and 12-15 are rejected for dependency upon the above rejected base claims 1 and 11, respectively.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2192

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-8 and 11-15 are rejected under 35 U.S.C. 102(b) as being anticipated by

Tirumalai et al. (US 6,341,370 B1), hereinafter Tirumalai.

As per claim 1, Tirumalai discloses a method of determining an execution order for machine instructions to reduce spill code (col.4: 40-50 "... in manner which minimizes spills..."), said method comprising the step of:

from machine instructions that are ready for scheduling(e.g. FIG. 2, SCHEDULE INSTRUCTION EXECUTION 235 and related text), scheduling the machine instruction for which an amount by which a size of a committed set of machine instructions would increase upon the scheduling of said machine instruction is smallest (col. 7:1-10 ".... after scheduling, ... computing the number of simultaneously live loop variant ..." and col.7:55-65 "... thresholds are usually just one or two less than the number ...").

As per claim 2, Tirumalai discloses the method of claim 1, wherein said committed set of machine instructions includes any machine instruction that is already scheduled and any machine instruction that is descendent from an already scheduled machine instruction (col.7: 55-65 ".... scheduling ... loop is rescheduled....").

As per claim 3, Tirumalai discloses the method of claim 2, wherein, for each of said machine instructions ready for scheduling, said amount is determined by:

identifying descendent machine instructions of each of said machine instructions (e.g. FIG. 2, 200 and related text); and determining which of said descendent machine instructions and said machine instructions is not in said committed set of machine instructions (e.g. FIG. 2, 205 and related text).

As per claim 4, Tirumalai discloses the method of claim 1, wherein said committed set of machine instructions includes any machine instruction that is descendent from an already scheduled machine instruction (col.7: 55-65 "... loop is rescheduled...").

As per claim 5, Tirumalai discloses the method of claim 4, wherein, for said each machine instruction ready for scheduling, said amount is determined by:

identifying descendent machine instructions of each of said machine instructions (e.g. FIG. 2, 200 and related text); and determining which of said descendent machine instructions is not in said committed set of machine instructions (e.g. FIG. 2, 205 and related text).

As per claim 6, Tirumalai discloses the method of claim 1, wherein a given machine instruction is considered ready for scheduling when scheduling of said given machine instruction as a next machine instruction would not cause an erroneous programmatic result (col.7: 55-65 "... scheduling ... loop is rescheduled...").

As per claim 7, Tirumalai discloses the method of claim 1, wherein said method is undertaken when a risk of register over committedness exceeds a certain threshold (col.7: 55-65 "... if the bounds exceeds the thresholds ...").

As per claim 8, Tirumalai discloses the method of claim 7, wherein said threshold is exceeded when processor register availability drops below a particular threshold (col.7: 10-25 "... lower bounds are less than the set of register pressure thresholds...").

As per claim 11, this is the computer program product version of the claimed method discussed above (Claim 1), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

As per claim 12, this is the computer program product version of the claimed method discussed above (Claim 2), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

As per claim 13, this is the computer program product version of the claimed method discussed above (Claim 3), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

As per claim 14, this is the computer program product version of the claimed method discussed above (Claim 4), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

As per claim 15, this is the computer program product version of the claimed method discussed above (Claim 5), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 9-10 and 16-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (US 6, 625,807 B1).

As per claim 9, Chen discloses a method of determining an execution order for machine instructions to reduce spill code (col.5: 30-45 "... minimize the load/store instruction for the spill ..."), said method comprising the steps of:

in a first bit vector containing one bit to represent each machine instruction to be scheduled, setting those bits for which the represented machine instruction is not committed, and resetting the remaining bits (col.6: 40-50 "... bit vector ..." and e.g. FIG. 4B, 62-120 and related text);

for said each machine instruction to be scheduled that is ready for scheduling (col.4:40-50 "... register allocation..."):

in a second bit vector also having one bit to represent each machine instruction to be ordered in the same sequence as in said first bit vector, setting those bits for which the represented machine instruction is a descendant of said each machine instruction that is ready for scheduling, and resetting the remaining bits (col.6:40-50 "... bit vector created in the code register usage annotator ...");

performing a bitwise AND operation of said first bit vector and said second bit vector to create a third bit vector (col.9: 23-30 "... implementing logical function ..."); and

determining the number of set bits in said third bit vector (e.g.FIG.10A, 126 and related text); and

selecting for execution the machine instruction for which said third bit vector contains a minimum number of set bits (e.g. FIG. 10A, 122 and related text).

As per claim 10, Chen discloses the method of claim 9, said method further comprising the step of, prior to performing said bitwise AND operation, setting in said second bit vector the bit for which the represented machine instruction is said each machine instruction that is ready for scheduling (col.9: 23-30 “.. implementing logical function ...”).

As per claim 16, Chen is the system version of the claimed method discussed above (Claim 9), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.

As per claim 17, Chen is the computer program product version of the claimed method discussed above (Claim 10), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tirumalaia.


Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isaac T. Tecklu whose telephone number is (571) 272-7957. The examiner can normally be reached on M-TH 9:300A - 8:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Isaac Tecklu
Art Unit 2192



TUAN DAM
SUPERVISORY PATENT EXAMINER